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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| EXAMINER | |
|---|---|
| SHINGLES, KRISTIE D | |
| **ART UNIT** | **PAPER NUMBER** |
| 2141 | |

DATE MAILED: 10/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/886,186 | CRADDOCK ET AL. | |
| | Examiner | Art Unit | |
| | Kristie Shingles | 2141 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *21 June 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 August 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

*Claims 1-42 are pending.*

### *Drawings*

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 110, 800, 816, 818, 820, 826, 830 and 1120. Corrected drawing sheets, or amendment to the specification to add the reference character(s) in the description, are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims **1, 7, 9, 15, 17, 23, 25, 31** and **37** are rejected under 35 U.S.C. 102(e) as being anticipated by *Parthasarathy et al* [US 20020184392].

a. Per claims 1, 9 and 17 (differs only by statutory class) *Parthasarathy et al* teach a method of transmitting data packets from a system area network device to an external network device, comprising:

- passing data generated by a host process to a host channel adapter [Abstract, 0031, 0032, Fig.2 and 4A; data is transmitted to a host system which is equipped with a host channel adapter—HCA]; and
- passing the data from the host channel adapter directly to a router coupled to an external network [Abstract, Fig.2, 0035, 0060-0063 and 0172; data is passed from the HCA interface to the multi-stage switch fabric—which can include routers—for communication with remote systems].

b. Per claims 25, 31 and 37 (differs only statutory class) *Parthasarathy et al* teach a method of routing data between a system area network and an external network, comprising:

- receiving data [0036; data is transmitted and received from the source to the destination via the multi-stage switch fabric];
- parsing a routing header of the data [0037-0039 and 0079; the global and local routing header provide the system with routing data for the packets—parsing of the headers is implied];
- identifying an output port of the router based on the parsing of the routing header [0028, 0029 and 0038-0039; the destination/output port is identified from the routing information]; and
- sending the data out of the router via the identified output port [0038-0042; once the specific output/destination port is identified, the data is transmitted out of it].

c. Per claims 7, 15 and 23 (differs only by statutory class) *Parthasarathy et al* teach the method of claim 1, wherein passing data generated by a host process to a host channel adapter includes using a Post Send verb to instruct the host channel adapter to send data from system memory to a designated destination [0004 and 0044-0049; work requests are posted to instruct and describe data movements for processing from system memory to a designated location].

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims **2-6, 10-14, 18-22, 26, 28-30, 32, 34-36, 38** and **40-42** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Parthasarathy et al* in view of *Karpoff* [US 20010049740].

a. Per claim 2, *Parthasarathy et al* teach the method of claim 1 as applied above, yet fail to distinctly teach method of claim 1, wherein passing the data generated by a host process to a host channel adapter includes invoking an Internet Protocol (IP) over InfiniBand (IB) device

driver. However, *Karpoff* teaches implementing IP over the InfiniBand architecture [0074-0075 and 0087-0089].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to allow for the incorporation of an Internet Protocol over the InfiniBand Architecture for the purpose of enhancing the network's data transmission capabilities. One skilled in the art would have been motivated to generate the claimed invention with a reasonable expectation of success.

b. Claims 10 and 18 contain limitations that are substantially equivalent to claim 2 and are therefore rejected under the same basis.

c. Per claim 3, *Karpoff* teaches the method of claim 2, wherein passing data generated by a host process to a host channel adapter includes creating an IP over IB Queue Pair in the host channel adapter for use with the IP over IB device driver [0085-0097; as part of the InfiniBand Architecture, queue pairs are created for nodal transactions—system allows for use of the queue pair with the IP over the InfiniBand Architecture].

d. Claims 11 and 19 contain limitations that are substantially equivalent to claim 3 and are therefore rejected under the same basis.

e. Per claim 4, *Karpoff* teaches the method of claim 2, wherein the step of passing data generated by a host process to a host channel adapter is performed in response to an I/O Transmit transaction being received by the IP over IB device driver [0087-0091, 0095-0097 and 0118-0120; various different messaging protocols—including IP—may be used to receive I/O stream processes, transport and transactions over the InfiniBand Architecture].

f. Claims 12 and 20 contain limitations that are substantially equivalent to claim 4 and are therefore rejected under the same basis.

g. Per claim 6, *Karpoff* teaches the method of claim 4, wherein the I/O Transmit transaction includes one or more pointers to one or more memory regions which contain the data, and wherein the I/O Transmit transaction further includes one of a destination address and destination address handle [0018, 0089-0093, 0094-0097 and 0106; transmission transactions include different headers—which act as pointers—and addresses for the source and destination and also a payload/data component with a trailer portion for data retrieval for memory locations].

h. Claims 14 and 22 contain limitations that are substantially equivalent to claim 4 and are therefore rejected under the same basis.

i. Per claim 26, *Parthasarathy et al* teach the method of claim 25 as applied above, yet fail to teach the method of claim 25, wherein identifying an output port of the router includes examining one of an InfiniBand Global Router Header's Destination Global Identifier and an IPv6 Destination Address. However, *Karpoff* teaches the identifying and addressing scheme provided by IPv6 incorporated with the use of InfiniBand global routing which would implicitly include a header/identifier mechanism [0088].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to identify a routing output port by examination of the InfiniBand global ID and IPv6 destination address for the purpose of tracking and maintenance of the routing activity with the use of an identifier and an address, furthermore the use of IPv6 essentially provides increased available address space, permitting the extension of the system. One skilled in the art

would have been motivated to generate the claimed invention with a reasonable expectation of success.

j. Claims 32 and 38 contain limitations that are substantially equivalent to claim 26 and are therefore rejected under the same basis.

k. Per claim 28, *Parthasarathy et al* teach the method of claim 25 as applied above, yet fail to distinctly teach the method of claim 25, wherein sending the data out of the router includes creating an InfiniBand link layer header for the data. However, *Karpoff* teaches the presence of header components corresponding to a layer of the Ethernet Protocol Stack, with the Link Layer header including the Ethernet header component typically a MAC address used for determining the correct destination for the packet [0085, 0090 and 0096-0097].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide an InfiniBand link layer header for the purpose of tracking and identification in the system from the link layer, which primarily deals with addressing and transmitting information. One skilled in the art would have been motivated to generate the claimed invention with a reasonable expectation of success.

l. Claims 34 and 40 contain limitations that are substantially equivalent to claim 28 and are therefore rejected under the same basis.

m. Per claim 29, *Karpoff* teaches the method of claim 28, wherein the InfiniBand link layer header identifies a host channel adapter receive queue [0085-0086 and 0090-0092; the InfiniBand linking protocol specifies a means to identify and map queued transactions to their prospective link or virtual lane on a HCA].

n. Claims 35 and 41 contain limitations that are substantially equivalent to claim 28 and are therefore rejected under the same basis.

o. Per claim 30, *Karpoff* teaches the method of claim 28, wherein the InfiniBand link layer header identifies an external network [Figs. 17A and 17B, 0033, 0046-0048, 0087-0088, 0100-0101, 0106 and 0114; by virtue of implementing InfiniBand technology, all transmissions begin or end with a channel adapter with an identification scheme for the transmission activity of its specific links/ports, in this system the controller device is equipped with at least one particular communication port dedicated to communicating with external networks—it is implicit communication via this port would include header information identifying the external network].

p. Claims 36 and 42 contain limitations that are substantially equivalent to claim 28 and are therefore rejected under the same basis.

q. Per claim 5, *Karpoff* teaches the method of claim 4 as applied above, yet fails to distinctly teach the method of claim 4, wherein the I/O Transmit transaction originates from one of a user level program and a kernel level program. However, *Parthasarathy et al* teach the ability for I/O transmissions to originate from user level and kernel level program [0058, 0063 and 0065].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide I/O transmission from a user level program and a kernel level program for the purpose of providing and establishing an I/O interface at the user and kernel level via software and hardware. One skilled in the art would have been motivated to generate the claimed invention with a reasonable expectation of success.

r. Claims 13 and 21 contain limitations that are substantially equivalent to claim 5 and are therefore rejected under the same basis.

6. Claims **8, 16** and **24** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Parthasarathy et al* in view of Applicant's Admitted Prior Art [AAPA].

a. Per claim 8, *Parthasarathy et al* teach the method of claim 1 as applied above, yet fail to distinctly teach the method of claim 1, wherein the data is passed to the host channel adapter as one of a Raw Datagram and a Unreliable Datagram. However, AAPA discloses the already inherent feature of the InfiniBand network to transport messages in the format of Raw Datagrams or Unreliable Datagrams [0005].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide data as a Raw Datagram and an Unreliable Datagram as a characteristic feature of the InfiniBand network as described in the background of the applicant's disclosure. One skilled in the art would have been motivated to generate the claimed invention with a reasonable expectation of success.

b. Claims 16 and 24 contain limitations that are substantially equivalent to claim 8 and are therefore rejected under the same basis.

7. Claims **27, 33** and **39** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Parthasarathy et al* in view of AAPA, and further in view of *Susnow et al* [US 20020159385].

a. Per claim 27, *Parthasarathy et al* teach the method of claim 25 as applied above, and AAPA disclosed data in the form of a Raw Datagram and Unreliable Datagram, yet *Parthasarathy et al* and AAPA fail to distinctly teach wherein if the data is an Unreliable Datagram and the identified output port is not an InfiniBand output port, an InfiniBand

Transport Header associated with the data is discarded. However, *Susnow et al* teach that data packets are discarded if the identified port is not an InfiniBand output port [0051-0055].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to discard data if the specified output port of the data is not an InfiniBand output port for the purpose of regulation in not allowing mis-routed data packets to congest the networking system. One skilled in the art would have been motivated to generate the claimed invention with a reasonable expectation of success.

b. Claims 33 and 39 contain limitations that are substantially equivalent to claim 27 and are therefore rejected under the same basis.

***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Gasbarro et al [US 20020141424] disclose a host-fabric adapter having a work queue entry ring hardware assist mechanism.

b. Avery (USPN 6,611,883) disclose a method and apparatus for implementing PCI DMA speculative pre-fetching in a message passing queue oriented bus system.

c. Foster et al [US 20030189927] disclose a method and system for multi-frame buffering in a routing device.

d. Pettey [US 20040128398] disclose a work queue to TCP/IP translation.

e. Beukema et al (USPN 6,578,122) disclose using an access key to protect and point to regions in windows for InfiniBand.

f. Foster et al [US 20020159468] disclose a method and system for administrative ports in a routing device.

g. Chui [USPN 20020165978] discloses a multi-service optical InfiniBand router.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kristie Shingles whose telephone number is 703-605-4244. The examiner can normally be reached on Monday-Friday 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rupal Dharia can be reached on 703-305-4003 (or 571-272-3888 after 10/26/04). The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kristie Shingles
Examiner
Art Unit 2141

kds

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PRIMARY EXAMINER